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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/049,650	05/02/2002	Ronald Kates	100564-00102	7878
6449	7590	03/25/2004	EXAMINER	
ROTHWELL, FIGG, ERNST & MANBECK, P.C. 1425 K STREET, N.W. SUITE 800 WASHINGTON, DC 20005			HIRL, JOSEPH P	
		ART UNIT		PAPER NUMBER
		2121		8
DATE MAILED: 03/25/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/049,650	KATES ET AL.
<b>Examiner</b>	<b>Art Unit</b>	
Joseph P. Hirl	2121	

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

1)  Responsive to communication(s) filed on 02 May 2002.

2a)  This action is **FINAL**.                            2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## **Disposition of Claims**

4)  Claim(s) 1-11 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-11 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are: a)  accepted or b)  objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)  The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)  Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a)  All b)  Some \* c)  None of:  
1.  Certified copies of the priority documents have been received.  
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a))

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1)  Notice of References Cited (PTO-892)  
2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3)  Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5.  
4)  Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_ .  
5)  Notice of Informal Patent Application (PTO-152)  
6)  Other:

### **DETAILED ACTION**

1. Claims 1-11 are pending in this application.
2. The claims and only the claims form the metes and bounds of the invention.

"Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris*, 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, I 45-48; p 2100-9, c 1, I 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

3. Examiner's Opinion:

Para 2 above applies. The entire disclosure needs substantial work. An application to the USPTO for a patent requires full compliance with the appropriate sections of the MPEP. The applicant's claims are particularly in want of work and in the response to this office action should be completely rewritten in a manner of substance and style fully consistent with that of the USPTO's MPEP. Specifically, terms such as "characterized", "in that furthermore", "that is to say", "if desired", "one assumes", "one decided", "per se", serve only to introduce confusion and indefiniteness into the claim. Referencing the preamble of an independent claim (1) in the body of a dependent claim

(4) that further incorporates indefinite features cited above raises the question: what's it all about?

***Abstract***

4. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

***Specification***

5. The specification does not follow the prescribed Content of Specification as identified in MPEP 608.01(a) and set forth below. Those areas of the requirements not pertaining may be omitted.

- (a) Title of the Invention: See 37 CFR 1.72(a) and MPEP § 606. The title of the invention should be placed at the top of the first page of the specification unless the title is provided in an application data sheet. The title of the invention should be brief but technically accurate and descriptive, preferably from two to seven words may not contain more than 500 characters.
- (b) Cross-References to Related Applications: See 37 CFR 1.78 and MPEP § 201.11.
- (c) Statement Regarding Federally Sponsored Research and Development: See MPEP § 310.

(d) Incorporation-By-Reference Of Material Submitted On a Compact Disc: The specification is required to include an incorporation-by-reference of electronic documents that are to become part of the permanent United States Patent and Trademark Office records in the file of a patent application. See 37 CFR 1.52(e) and MPEP § 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text were permitted as electronic documents on compact discs beginning on September 8, 2000.

Or alternatively, Reference to a "Microfiche Appendix": See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.

(e) Background of the Invention: See MPEP § 608.01(c). The specification should set forth the Background of the Invention in two parts:

- (1) Field of the Invention: A statement of the field of art to which the invention pertains. This statement may include a paraphrasing of the applicable U.S. patent classification definitions of the subject matter of the claimed invention. This item may also be titled "Technical Field."
- (2) Description of the Related Art including information disclosed under 37 CFR 1.97 and 37 CFR 1.98: A description of the related art known to the applicant and including, if applicable, references to specific related art and problems involved in the prior art which are solved by the applicant's invention. This item may also be titled "Background Art."

(f) Brief Summary of the Invention: See MPEP § 608.01(d). A brief summary or general statement of the invention as set forth in 37 CFR 1.73. The summary is separate and distinct from the abstract and is directed toward the invention rather than the disclosure as a whole. The summary may point out the advantages of the invention or how it solves problems previously existent in the prior art (and preferably indicated in the Background of the Invention). In chemical cases it should point out in general terms the utility of the invention. If possible, the nature and gist of the invention or the inventive concept should be set forth. Objects of the invention should be treated briefly and only to the extent that they contribute to an understanding of the invention.

(g) Brief Description of the Several Views of the Drawing(s): See MPEP § 608.01(f). A reference to and brief description of the drawing(s) as set forth in 37 CFR 1.74.

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- (h) Detailed Description of the Invention: See MPEP § 608.01(g). A description of the preferred embodiment(s) of the invention as required in 37 CFR 1.71. The description should be as short and specific as is necessary to describe the invention adequately and accurately. Where elements or groups of elements, compounds, and processes, which are conventional and generally widely known in the field of the invention described and their exact nature or type is not necessary for an understanding and use of the invention by a person skilled in the art, they should not be described in detail. However, where particularly complicated subject matter is involved or where the elements, compounds, or processes may not be commonly or widely known in the field, the specification should refer to another patent or readily available publication which adequately describes the subject matter.
- (i) Claim or Claims: See 37 CFR 1.75 and MPEP § 608.01(m). The claim or claims must commence on separate sheet or electronic page (37 CFR 1.52(b)(3)). Where a claim sets forth a plurality of elements or steps, each element or step of the claim should be separated by a line indentation. There may be plural indentations to further segregate subcombinations or related steps. See 37 CFR 1.75 and MPEP § 608.01(i)-(p).
- (j) Abstract of the Disclosure: See MPEP § 608.01(f). A brief narrative of the disclosure as a whole in a single paragraph of 150 words or less commencing on a separate sheet following the claims. In an international application which has entered the national stage (37 CFR 1.491(b)), the applicant need not submit an abstract commencing on a separate sheet if an abstract was published with the international application under PCT Article 21. The abstract that appears on the cover page of the pamphlet published by the International Bureau (IB) of the World Intellectual Property Organization (WIPO) is the abstract that will be used by the USPTO. See MPEP § 1893.03(e).
- (k) Sequence Listing, See 37 CFR 1.821-1.825 and MPEP §§ 2421-2431. The requirement for a sequence listing applies to all sequences disclosed in a given application, whether the sequences are claimed or not. See MPEP § 2421.02.

This objection must be corrected.

***Claim Rejections - 35 USC § 101***

6. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

7. Claims 1-11 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The language of claims 1-11 raises questions as to whether the claims are directed merely to abstract ideas that are not tied to the technological arts, environment or machine which would result in a practical application producing a concrete, useful, and tangible result to form the basis of a statutory subject matter under 35 USC 101.

***Claim Rejections - 35 USC § 112***

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 1-11 are rejected under 35 USC 112, first paragraph because current case law (and accordingly, the MPEP) require such a rejection if a 101 rejection is given because when Applicant has not in fact disclosed the practical application for the invention, as a matter of law there is no way Applicant could have disclosed how to practice the undisclosed practical application. This is how the MPEP puts it:

("The how to use prong of section 112 **incorporates as a matter of law** the requirement of 35U.S.C. 101 that the specification disclose as a matter of fact a practical utility for the invention.... If the application fails as a matter of fact to satisfy 35 U.S.C. 101, then the application also fails as a matter of law to enable one of ordinary skill in the art to use the invention under 35 U.S.C. § 112."); *In re Kirk*, '376 F.2d 936, 942, 153 USIPQ 48, 53 (CCPA 1967) ("Necessarily, compliance with § 112 requires a description of how to use presently useful inventions, otherwise an applicant would anomalously be required to teach how to use a useless invention."). See, MPEP 21107.01 (IV), quoting *In re Kirk* (emphasis added).

Therefore, claims 1-11 are rejected on this basis.

10. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

11. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Terms such as "characterized", "in that furthermore", "that is to say", "if desired", "one assumes", "one decided" and "per se" serve only to fuzzify a claim and in so doing create confusion, uncertainty and indefiniteness. Referencing the preamble of an independent claim (1) in the body of a dependent claim (4) further fuzzifies the metes and bounds of the invention.

### ***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

13. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Mehrotra et al (MIT Press, 1997, referred to as **Mehrotra**).

**Claim 1**

Mehrotra anticipates an input layer having a plurality of input neurons (**Mehrota**, p 19, Fig. 1.14), at least one intermediate layer having a plurality of intermediate neurons (**Mehrota**, p 19, Fig. 1.14), an output layer having a plurality of output neurons (**Mehrota**, Fig. 1.14), and a multiplicity of synapses which interconnect two neurons of different layers in each case (**Mehrota**, p 19, Fig. 1.14), characterized in that the training of the neural network comprises a structure simplification procedure, that is to say the location and elimination of synapses that have no significant influence on the curve of the risk function (**Mehrota**, p 116, I 8-19; p 118, I 4-5; Examiner's Note (EN): para 2 above applies; curve of the risk function is synonymous with Mehrota's error analysis), in that a1) one selects two sending-neurons that are connected to one and the same receiving neuron (**Mehrota**, p. 19, Fig. 1.14; p 116, I 31-32), a2) one assumes that the signals output from said sending neurons to the receiving neuron essentially exhibit the same qualitative behavior, that is to say are correlated to one another (**Mehrota**, p 19, Fig. 1.14; p 116, I 30-32), a3) one interrupts the synapse of one of the two sending neurons to the receiving neuron and instead adapts accordingly the weight of the synapse of the respective other sending neuron to the receiving neuron (**Mehrota**, p 19, Fig. 1.14; p 116, I 33-34), a4) one compares the reaction of the neural network changed in accordance with step a3) with the reaction of the unchanged neural

network (**Mehrota**, p 19, Fig. 1.14; p 116, l 33-34), and a5) if the variation of the reaction does not exceed a predetermined level, one decides to keep the change made in step a.3) (**Mehrota**, p 19, Fig. 1.14; p 118, l 1-5).

**Claim 2**

Mehrota anticipates that the two sending neurons are located on one and the same layer (**Mehrota**, p 19, Fig. 1.14).

**Claim 3**

Mehrota anticipates that furthermore the value of the bias of the receiving neuron is adapted in step a3) (**Mehrota**, p 19, Fig. 1.14; p 116, l 33-34, p117, l 10-11).

**Claim 4**

Mehrota anticipates a method for training a neural network in accordance with the preamble of claim 1 and if desired with the characterizing parts of claim 1 (**Mehrota**, p 19, Fig. 1.14), characterized in that the training of the neural network comprises a structure simplification procedure, that is to say the location and elimination of synapses that have no significant influence on the curve of the risk function (**Mehrota**, p 116, l 8-19; p 118, l 4-5; EN: para 2 above applies; curve of the risk function is synonymous with Mehrota's error analyses) in that b1) one selects a synapse (**Mehrota**, p 117, l 1-9), b2) one assumes that said synapse does not have a significant influence on the curve of the risk function (**Mehrota**, p 117, l 1-9), b3) one interrupts said synapse (**Mehrota**, p 117, l 1-9), b4) one compares the reaction of the neural network changed in accordance with step b3) with the reaction of the unchanged neural network (**Mehrota**, p 117, l 1-9), and

b5) if the variation of the reaction does not exceed a predetermined level, one decided to keep the change made in step b3) (**Mehrota**, p 117, I 1-9).

#### **Claim 5**

Mehrota anticipates in that, when in the course of the structure simplification procedure n-1 synapses have already been eliminated and the strength of the influence of an nth synapse is being tested, the reaction of the neural network reduced by n synapses is not only compared with the reaction of a network reduced by only n-1 synapses, but also with the reaction of the neural network with its complete structure as present~ at the beginning of said structure simplification procedure, and in that the elimination of the nth synapse is only retained if the deviation of the reaction does not exceed a predetermined level for both comparisons (**Mehrota**, p 117, I 1-9; EN: para 2 above applies; since the threshold was set based on the original network configuration, each pruning action is indeed being done against both baselines...the original one as the starting point and the current one resulting from the immediate action.).

#### **Claim 6**

Mehrota anticipates that the value of a likelihood function is calculated for the neural network to represent the reaction of the neural network (**Mehrota**, p 118, I 1-5; EN: para 2 above applies; Mehrorta'  $\Delta E$  is synonymous with a likelihood function).

#### **Claim 7**

Mehrota anticipates structure variants of the neural network are compared using a significance test (**Mehrota**, p 118, I 1-5; EN: para 2 above applies; Mehrorta'  $\Delta E$  check against a threshold is a significance test).

**Claim 8**

Mehrota anticipates the structure variants of the neural network are compared using the CHI-SQUARED test which is known per se (**Mehrota**, p 118, l 1-5; EN: para 2 above applies; CHI-SQUARED test is a measure of the deviation from the expectation as is Mehrorta'  $\Delta E$  check against a threshold).

**Claim 9**

Mehrota anticipates structure variants of the neural network are compared using the BOOT-STRAPPING method which is known per se (**Mehrota**, p 117, l 1-9; EN: para 2 above applies; BOOT-STRAPPING is a sampling method for estimating values that would be difficult to infer analytically; Mehrorta check against a threshold functions in a synonymous way).

**Claim 10**

Mehrota anticipates that, to compare two structure variants of the neural network, the ratio of the values of the likelihood functions for said two structure variants is calculated (**Mehrota**, p 118, l 1-5; EN: para 2 above applies; a ratio test will vary from zero to infinity with unity as the point of equality; similarly, Mehrorta's  $\Delta E$  check against a threshold will accordingly vary in a similar fashion where the threshold is equivalent to the applicants unity value).

**Claim 11**

Mehrota anticipates a method for training a neural network in accordance with the preamble of claim 1 and if desired with the characterizing parts of claim 1, characterized in that the training of the neural network comprises an optimization

procedure in which the strengths of the individual synapses, that is to say the strengths of the connections between the neurons, are optimized, and in that the simplex method which is known per se is used for said optimization (**Mehrota**, p 117, l 1-9; EN: para 2 above applies; Mehrota's selective node removal represents optimization of the Mehrota's initial network since Mehrota's goal is a pruned (optimized); Mehrota's hyperplane adjustments made in Fig. 4.6 are synonymous to the simplex method of the inventor).

### ***Conclusion***

14. The prior art of record and not relied upon is considered pertinent to applicant's disclosure.

- Takatori et al, U.S. Patent 5,528,700
- Lo et al, U.S. Patent 6,601,051
- Deangelis et al, U.S. Patent 5,734,797
- Bar-Yam, U.S. Patent 5,687,286
- Basu et al, U.S. Patent 6,594,629

15. Claims 1-11 are rejected.

**Correspondence Information**

Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anil Khatri can be reached at (703) 305-0282.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

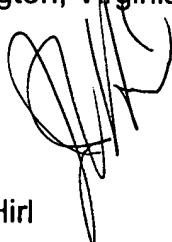
(703) 746-7290 (for informal or draft communications with notation of "Proposed" or "Draft" for the desk of the Examiner).

Hand-delivered responses should be brought to:

Receptionist, Crystal Park II

2121 Crystal Drive,

Arlington, Virginia.



Joseph P. Hirl

March 18, 2004